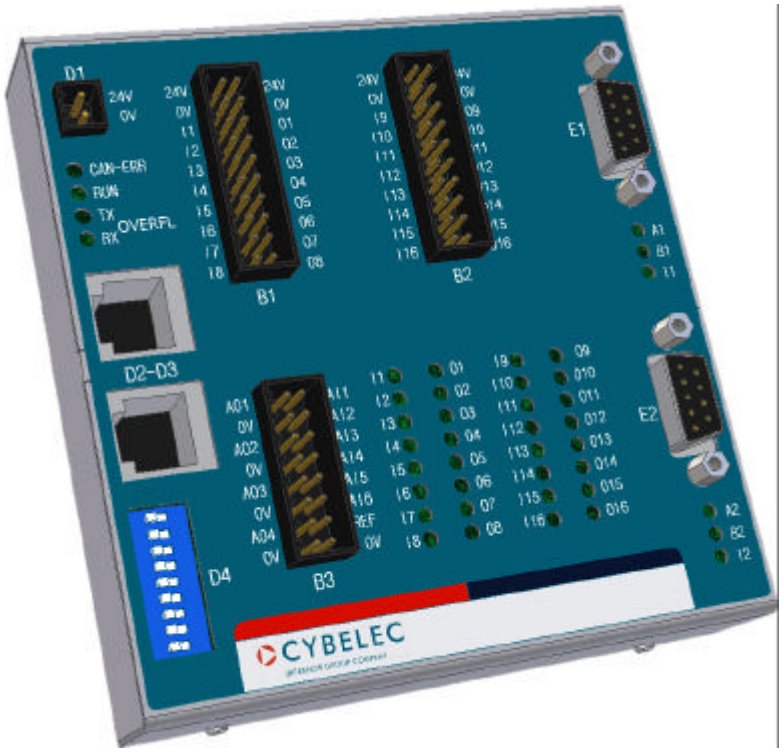
CYBELEC
INFRANOR GROUP COMPANY

CANopen IO Module
User's Manual



CANOPEN-16DI-16DO-6AIx-4AOx-2E

!!! Warning!!!

Cybelec reserves the right to change any information contained in this manual without notice.

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1 REFERENCE

CiA DS-301	Application Layer and Communication Profile Version 4.01
CiA DS-401	Device Profile for Generic IO Modules Version 2.1
CiA DS-406	Device Profile for Encoder Version 2.0

2 DEFINITIONS

CAN	Controller Area Network
CiA	CAN in Automation e. V. CAN-Bus international manufacturer and user organization
CAL	CAN Application Layer. The Application layer for CAN as specified by CiA
COB	Communication Object is a CAN message. Data must be sent across a CAN network inside a COB.
COB-ID	COB-Identifier. Each CAN message has a single identifier. There are 2032 different identifiers in a CAN network.
NMT	Network Management. One of the services of the application layer. It performs initialization, configuration and error handling in a CAN network.
PDO	Process Data Object.
SDO	Service Data Object.

3 GENERAL INFORMATION

3.1 MANUAL HISTORY

Revision	Date	Comments
1.0	14.03.2005	Preliminary revision, DBu

3.2 SAFETY GUIDELINES

3.2.1 Introduction

IO Modules devices have been designed developed or manufactured for conventional use in industry. They were not designed, developed and manufactured for any use involving serious risks or hazards that without the implementation of exceptionally stringent safety precautions could lead to death, injury, serious physical damage or loss of any other kind. Such risks and hazards include in particular the use of these devices to monitor nuclear reactions in nuclear power plants, as well as flight control systems, flight safety, the control of mass transportation systems, medical life support systems, and the control of weapons systems.

When using IO Modules with programmable logic controllers and when using operating and monitoring devices as control systems in conjunction with a Soft PLC, the safety precautions applying to industrial control systems (e.g. the provision of safety devices such as emergency stop circuits, etc.) in accordance with applicable national and international regulations must be observed. The same applies for all other devices connected to the system, such as drives. All tasks such as installation, commissioning and service may only be carried out by qualified personnel. Qualified personnel are persons who are familiar with the transport, mounting, installation, commissioning and operation of the product and have the appropriate qualifications. National accident prevention guidelines must be followed. The safety guidelines, connection descriptions and limit values listed in the technical data must be read carefully before installation and commissioning and must be observed.

3.2.2 Intended Use

Electronic devices are generally not fail-safe. In the event of a failure on the IO Modules, operating or monitoring device or uninterruptible power supply, the user is responsible for ensuring that other devices that may be connected, such as motors, are made safe.

3.2.3 Transport and Storage

During transport and storage, devices must be protected from excessive stress (mechanical load, temperature, humidity, aggressive atmosphere).

3.2.4 Installation

- The installation must take place according to the documentation.
- The IO Modules are only allowed to be installed without voltage applied and by qualified personnel.
- General safety regulations and nationally applicable accident prevention guidelines must be observed.
- Electrical installation must be carried out according to the relevant guidelines (e.g. line cross section, fuse, protective ground connection).

3.3 IO MODULE CONFIGURATION TABLE

Type	Description	Ordering key 2)								
Bus Coupler	CANopen Bus Coupler	CANOPEN-	xDI-	xDO-	xAI	x-	xAO	x-	xE-	x
Digital IO	8 DI 24VDC - 8DO 24VDC 3A		8	8						
	16 DI 24VDC		16	0						
	16 DO 24VDC 3A		0	16						
	16 DI 24VDC - 16DO 24VDC 3A		16	16						
	32 DI 24VDC		32	0						
	32 DO 24VDC 3A		0	32						
Analog IO	none				0	1)	0	1)		
	6AD 12Bit - 4DA 12Bit				6	1)	4	1)		
	12AD 12Bit				12	1)	0	1)		
	8DA 12Bit				0	1)	8	1)		
Encoder	None								0	
	2 Encoder Inputs								2	
Revision	Configuration Table Revision Number									1.0

1) P for (O…10VDC) or N for (-10…10VDC)

2) Ordering key example: CANOPEN-16DI-16DO-6AIP-4AON-2E-1.0

Option available today

Option that may be available in the future

Table: IO Module Configuration table

4 TECHNICAL DATA

4.1 GENERAL INFORMATION

The IO Module from Cybelec offers the flexibility of a modular IO system and provides a solution for a wide range of applications. Thanks to the flat structure with a height of just 40mm, the module can also be used in particularly low terminal boxes.
The IO Modules is more than a remote IO system; it is a complete control solution.

The main characteristics of the Cybelec IO Module are the followings:

- Low cost.
- Adaptable.
- Flexible.
- Powerful.

4.1.1 Features

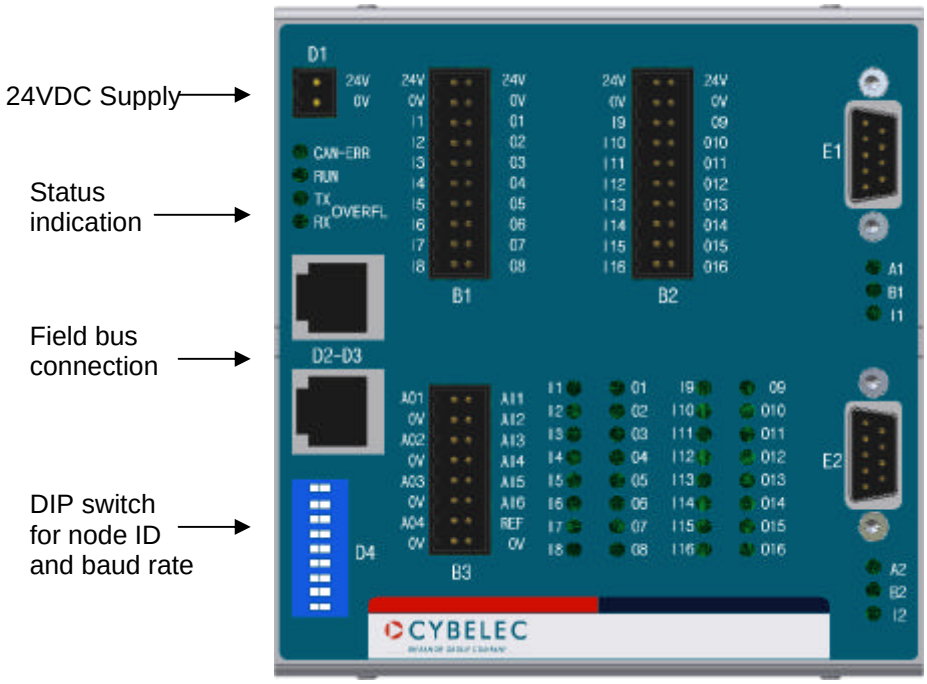


Fig: CANOPEN-16DI-16DO-6AIx-4AOIx-2E

The device is comprised of:

- 24VDC Supply connector.
- Display elements (LEDs) for status display of the operation, the bus communication, as well as for fault messages and diagnosis.
- CAN bus and RS232 bus connector.
- DIP switch for node ID and baud rate.

4.2 IO MODULE INTERFACES

In the following section, a description is given for all interfaces and plugs which an IO Module can have.

4.2.1 Power Supply

Input voltage: 24VDC ± 15%.

The supply voltage is internally protected, so that the device cannot be damaged if there is an overload or if the voltage supply is connected incorrectly.

Supply Voltage	
Pin	**Description**
1	24VDC
2	GND
Accessorie	
1690420000	Weidmüller Connector (BLZF 3.5/2)

Fig: Supply Voltage Connection

4.2.2 Field Bus Connection

Field Bus Connection	
Pin	**Description**
1	CAN_H
2	CAN_L
3	GND
4	RS232_RX (In)
5	RS232_TX (Out)
6	-
7	GND
8	-

Fig: Field bus connector

4.2.3 Display Elements

The operating condition of the field bus device is signaled via LEDs.

Display Elements	
LED	**Description**
CAN_ERR	Device generate an Error
RUN	Device state: Pre-operational (Blinking); Operational(On), Stop Mode(Flashing)
TX-OVERFL	CAN transmitter buffer is full.
RX-OVERFL	CAN receiver buffer is full.

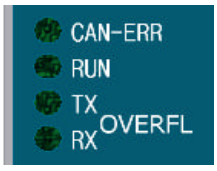


Fig: Display elements

4.2.4 Setting the IO Module Address (Module ID)

The DIP switches are used both for setting the baud rate of the field bus device and for setting the module ID. This module ID is necessary for calculating the COB IDs.

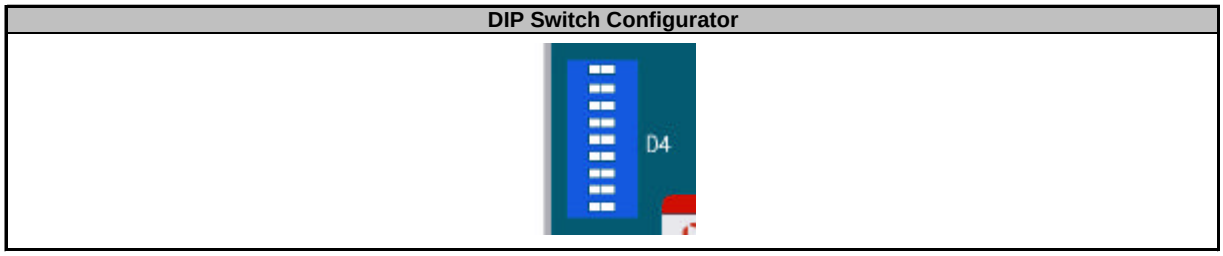


Fig: Setting the device node address

The binary significance of the individual DIP switches increases according to the switch number, i.e. the module ID 1 is set by DIP1 = 'ON', the module ID 8 by DIP4 = 'ON', etc.
The nodes of the Cybelec-IO-System can have module IDs from 1 to 127.

4.2.5 Setting the Baud Rate

The device supports 9 different Baud rates. DIP Switches are used to set the baud rate.

The device changes to the configuration mode using the set module ID = 0 (all DIP switches off) with subsequent power On. The current set baud rate is displayed in this status. The baud rate display is shown by the LED group (CAN-ERR, RUN, TX-OVERFL, RX-OVERFL), whereby CAN-ERR = Switch1, RUN = Switch2, TX-OVERFL = Switch3, RX-OVERFL = Switch4. The current set baud rate is displayed by the corresponding LEDs. Now the new baud rate can be set using the DIP switch, by turning the corresponding DIP switches to 'ON'.

The set configuration is saved by turning DIP8 to 'ON'. Following saving, all four LEDs are turned 'On'.

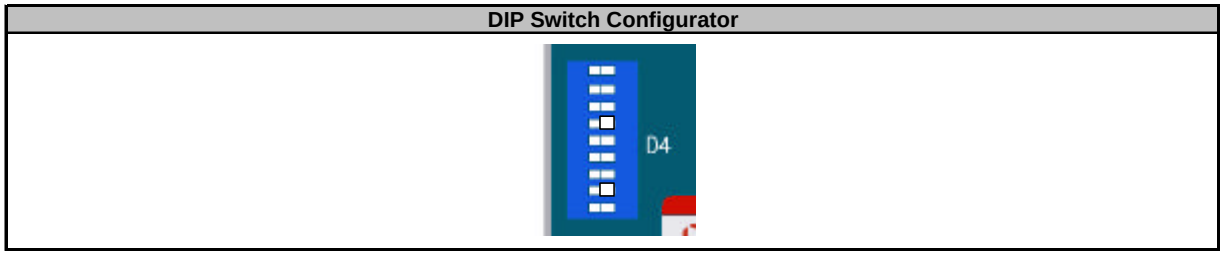


Fig: Example: Saving the baud rate 125kBit

DIP	Function	1 MBit	800 kBit	500 kBit	250 kBit	125 kBit	100 kBit	50 kBit	20 kBit	10 kBit	is displayed by LED
1 (LSB)	Baud rate	0	1	0	1	0	1	0	1	0	CAN-ERR
2	Baud rate	0	0	1	1	0	0	1	1	0	RUN
3	Baud rate	0	0	0	0	1	1	1	1	0	TX-OVERFL
4 (MSB)	Baud rate	0	0	0	0	0	0	0	0	1	RX-OVERFL
5											
6											
7											
8	Acceptance	off' -> 'on': Accepting the configuration settings									
9	CAN Bus Termination	On -> Add a terminal resistor of 120 O to the CAN bus.									

Once the baud rate setting is completed, switch off the operating voltage.

Caution!

Only the last IO module of a CANopen network need to set the CAN Bus Termination trough the DIP Switch 9 (cf. Network Topology).

4.2.6 Digital Input and Output Connectors

Input 1 (I1) and respectively Input 2 (I2) are connected to fast interrupt inputs. Those fast interrupts may be used for latching or preloading positions with Encoder Inputs (cf. Manufacturer Device Profile).

Digital Input and Output Connectors	
B1	**Description**
24V	24VDC
0V	GND
Ix	24VDC Input (Typ: Sink)
Ox	24VDC Output (Typ: Source)
B2	**Description**
24V	24VDC
0V	GND
Ix	24VDC Input (Typ: Sink)
Ox	24VDC Output (Typ: Source)

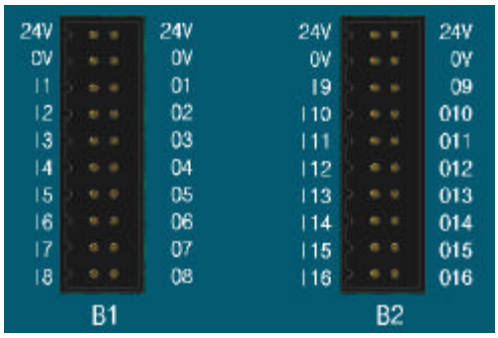


Fig: Digital Input and Output Connectors

4.2.7 Analog Input and Output Connector

Analog Input and Output Connector	
B3	**Description**
AIx	0..10 / ±10VDC Input 1)
REF	10V Reference voltage
0V	AGND
AOx	0..10 / ±10VDC 1)
0V	AGND

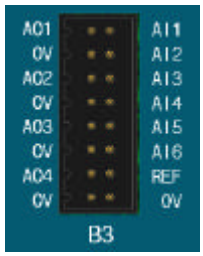


Fig: Analog Input and Output Connector

1) Cf. to the "IO Module Configuration table".

4.2.8 Encoder Input Connectors

Encoder Input Connectors (E1 - E2)	
Pin	**Description**
1	GND
2	A\
3	B\
4	I\
5	5VDC
6	A
7	B
8	I
9	GND

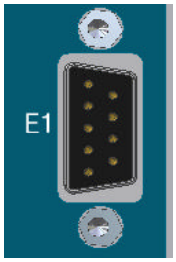


Fig: Encoder Input Connectors

5 CANOPEN-16DI-16DO-6AIx-4AOx-2E

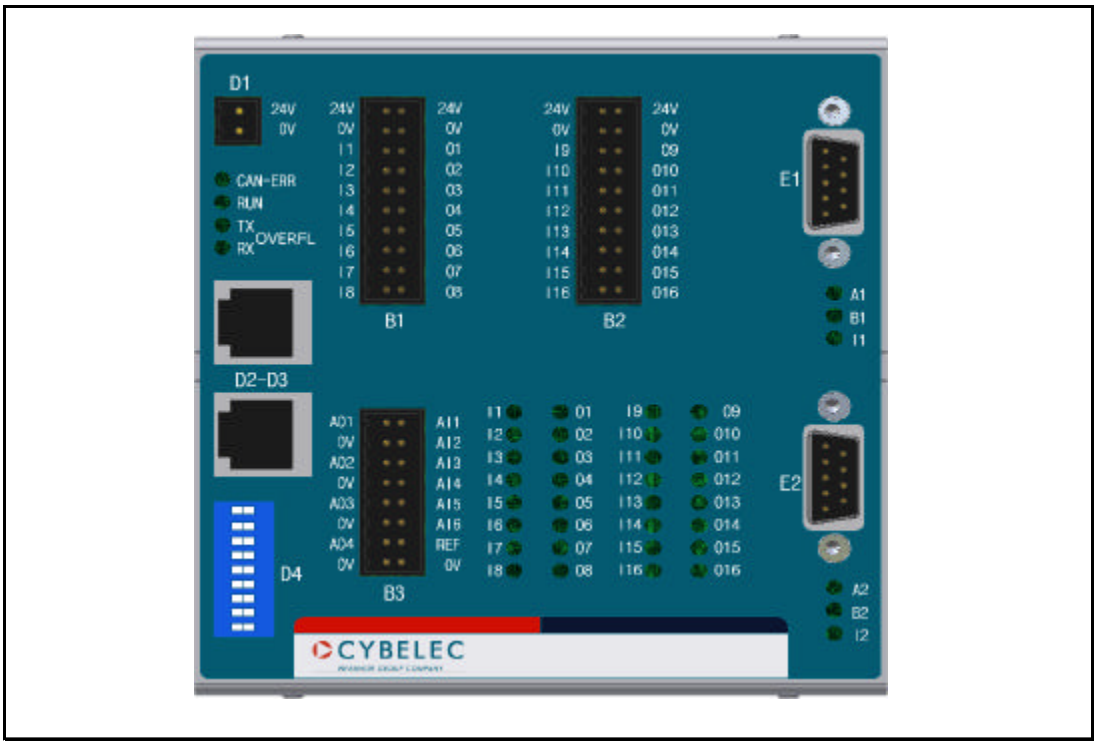


Fig: CANOPEN-16DI-16DO-6AIx-4AOx-2E Front view

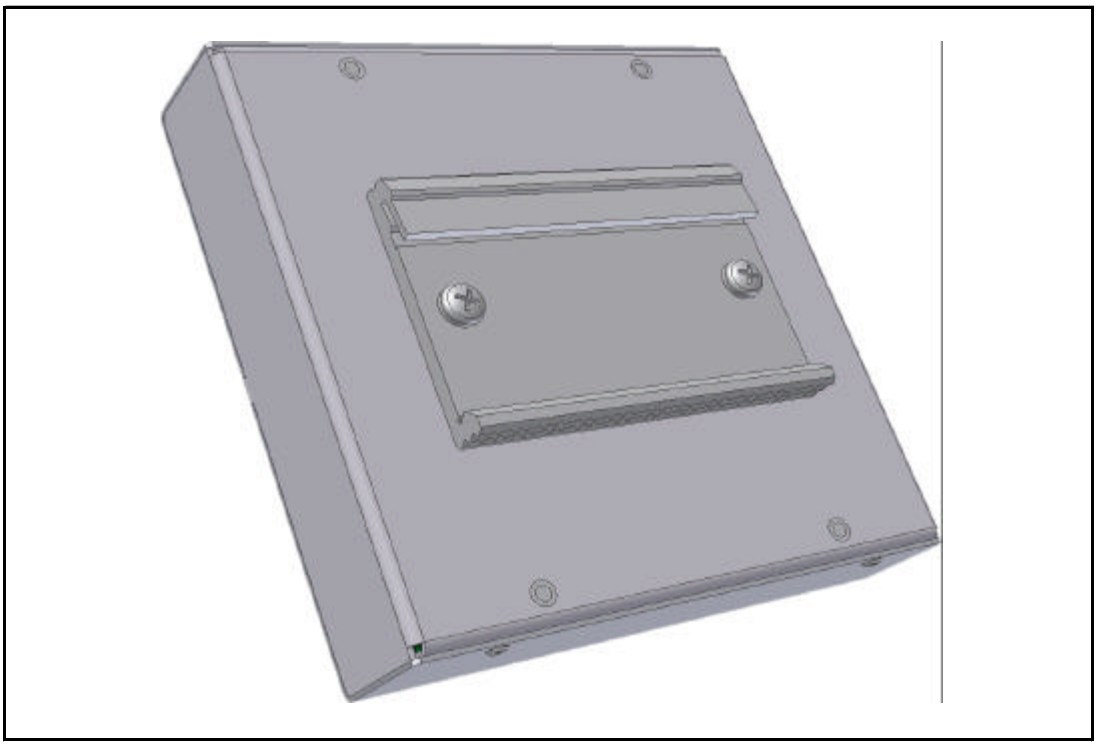


Fig: CANOPEN-16DI-16DO-6AIx-4AOx-2E Rear view

5.1 Technical Data

Description	CANOPEN-16DI-16DO-6AIx-4AOx-2E
Digital Channels	16 inputs, 16 outputs
Analog Channels	6 inputs, 4 outputs
Encoder Interfaces	2 encoder inputs
Bus Interface	CAN IO Slave
Supply Voltage	24VDC
Digital Inputs	16
Rated Voltage	24VDC
Input Filter	No
Input Circuit	Sink
Additional Functions	2 Fast Interrupts Inputs, Protection against over-voltage
Digital Outputs	16
Rated Voltage	24VDC
Nominal Output Current	3A per Output
Total Current	Max.10A per Connector (B2L 3.5/20)
Output Circuit	Source
Output Protection	Thermal cutoff for over-current or short circuit, Integrated protection for switching inductances
Additional Functions	Pulse width modulation, Overload current controlled by software
Analog Inputs	6
Input	0..10V / ±10V 1)
Digital Converter Resolution	12 Bit
Conversion Time	<1ms for all channels
Output Format	DWORD
Basic Accuracy	±0.25% at 25°C
Input Protection	Protection against over-voltage
Analog Outputs	4
Output	0..10V / ±10V (-25/+60mA) 1)
Digital Converter Resolution	12Bit
Conversion Time	<1ms for all channels
Basic Accuracy	±0.25% at 25°C
Output Protection	No
Encoder Inputs	2
Encoder connections	AA\,BB\,II\
Sensor supply voltage	5 VDC (Max. 100mA / per Encoder)
Bit width	32 Bit
Maximum frequency	75 Mhz
Additional Functions	Latch, Preload, (cf. Manufacturer Device Profile)
Interface	
Field bus interface	CAN IO Slave
Wiring	RJ45 S/STP Cat.5
Maximum Baud Rate	1 Mbit/s
General Information	
Certification	(CE)
Status Display	IO function for each channel, status
Diagnostics	
IO Function	Yes, with LEDs
CAN Interface	Yes, with LEDs

Mechanical Characteristics	
Dimensions in mm (WxHxD)	112x116x26.1
Weight	xxx g
Protection	IP 40
Operating/Storage Temperature	0 to 50°C / -20 to +70°C
Humidity	5 - 95%, non-condensing

Table: CANOPEN-16DI-16DO-6AIx-4AOx-2E

1) Cf. to the "IO Module Configuration table" to order the corresponding device.

5.2 Dimensions

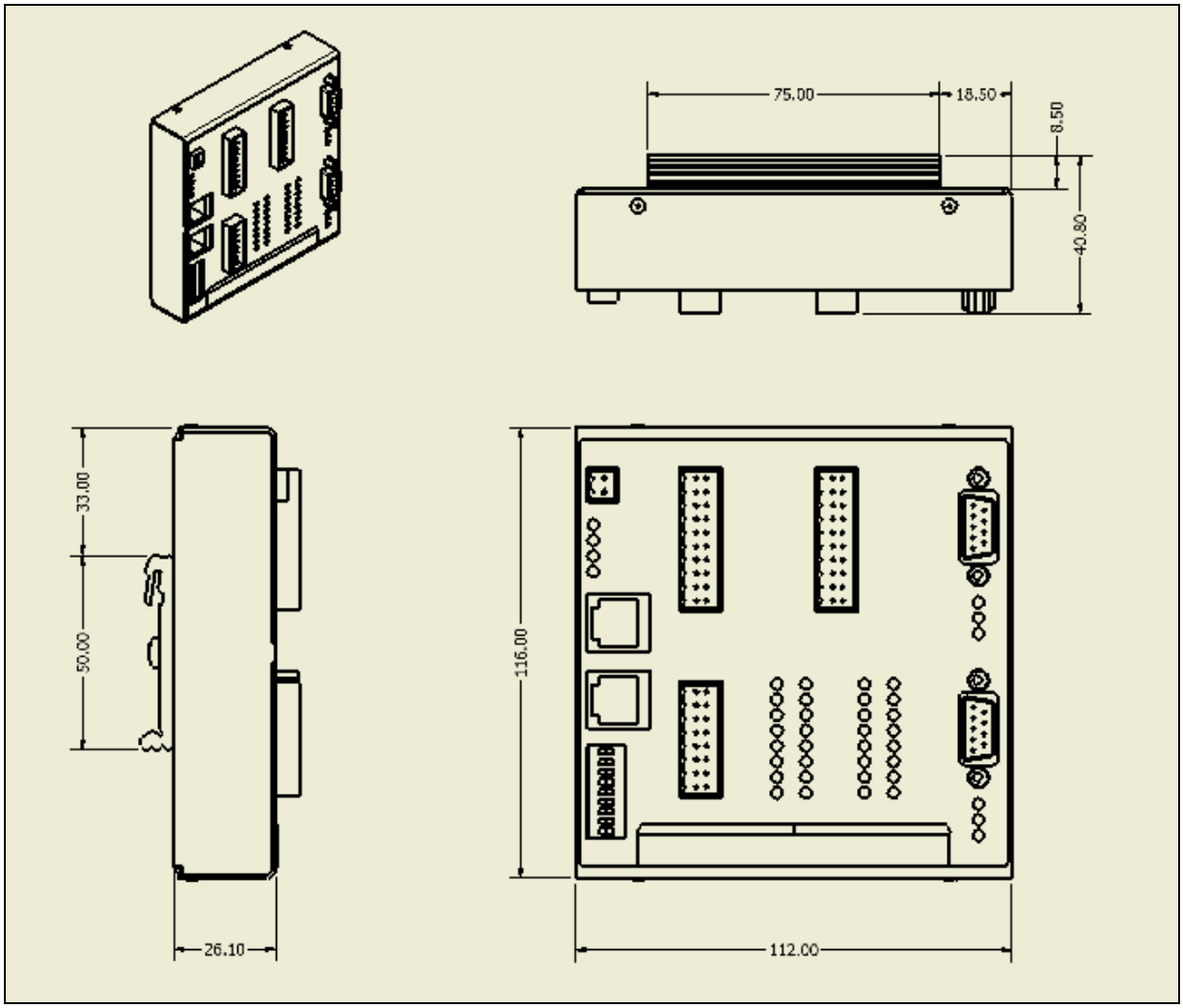


Fig: CANOPEN-16DI-16DO-6AIx-4AOx-2E Dimensions in mm

6 MOUNTING

6.1 MOUNTING INSTRUCTIONS

The IO Module can be snapped directly onto a carrier rail in accordance with the European standard EN 50022 (DIN35).

Carrier rails have different mechanical and electrical properties. For the optimal system setup on a carrier rail, certain marginal terms must be observed.

- The material must be non-corrosive.
- Most components have a contact to the carrier rail to ground electro-magnetic disturbances. In order to avoid corrosion, this tin-plated carrier rail contact must not form a galvanic cell with the material of the carrier rail which generates a differential voltage above 0.5V.
- The carrier rail must optimally support the EMC measures integrated into the system and the shielding of the IO Module connections.
- A sufficiently stable carrier rail should be selected and, if necessary, several assembly points (every 20 cm) should be used in order to prevent bending and twisting (torsion).
- The geometry of the carrier rail must not be altered in order to secure the safe hold of the components. In particular, when shortening or mounting the carrier rail, it must not be crushed or bent…

6.2 SPACING

The spacing between adjacent components, cable conduits, casing and frame sides must be maintained for each IO Module.

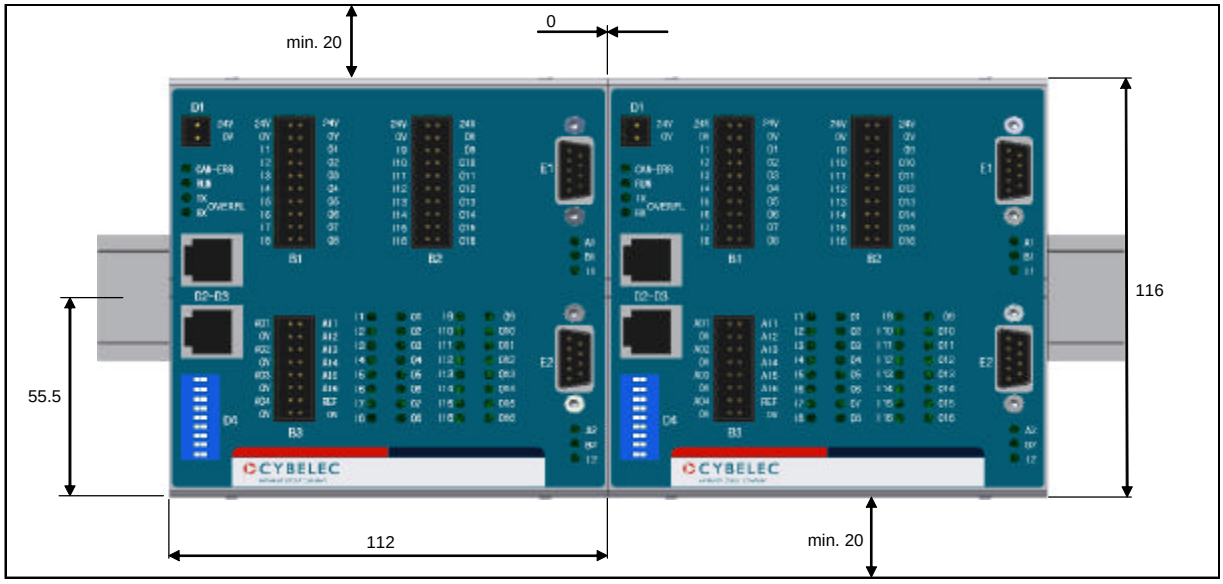


Fig: Spacing in mm

7 NETWORK TOPOLOGY

To build a simple CANopen network, you need a master (for example an ELITE device) and connection cables (RJ45 S/STP Cat.5) in addition to CANOPEN IO Modules.

The CANopen Network is constructed as a line structure with matching resistors (120 Ohm). In systems having more than two stations, all subscribers are wired in parallel.

All net subscribers communicate at the same baud rate. In the network, all IO Modules nodes operate as slaves. The master operation is taken over by a central control system, such as the ELITE device.

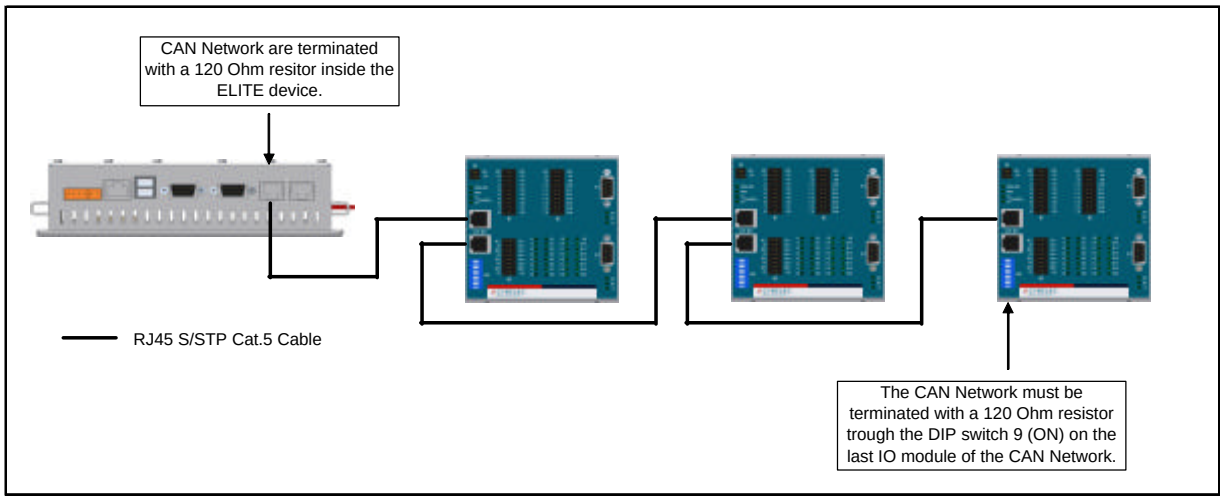

CAN Network are terminated with a 120 Ohm resitor inside the ELITE device.
RJ45 S/STP Cat.5 Cable
The CAN Network must be terminated with a 120 Ohm resistor trough the DIP switch 9 (ON) on the last IO module of the CAN Network.

Fig: Network Topology

Caution!

Take care that you have set correctly all node ID and baud rate for each IO Module on the CANopen Network.

8 NETWORK INITIALISATION AND SYSTEM BOOT-UP

8.1 NMT STATE MACHINE

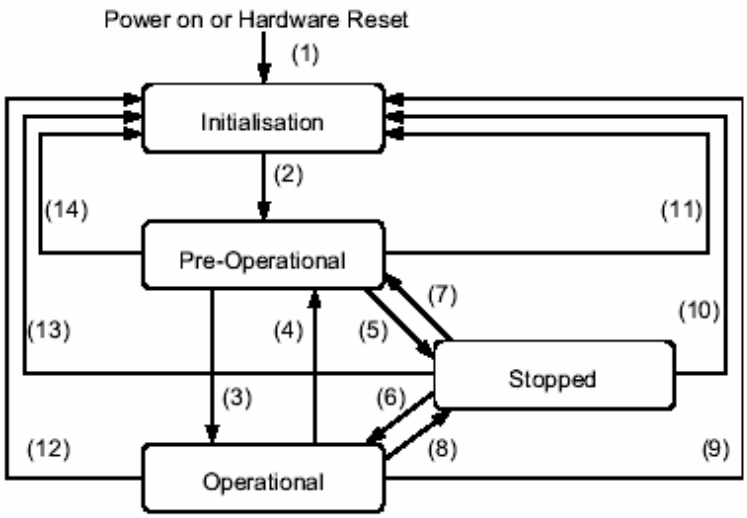
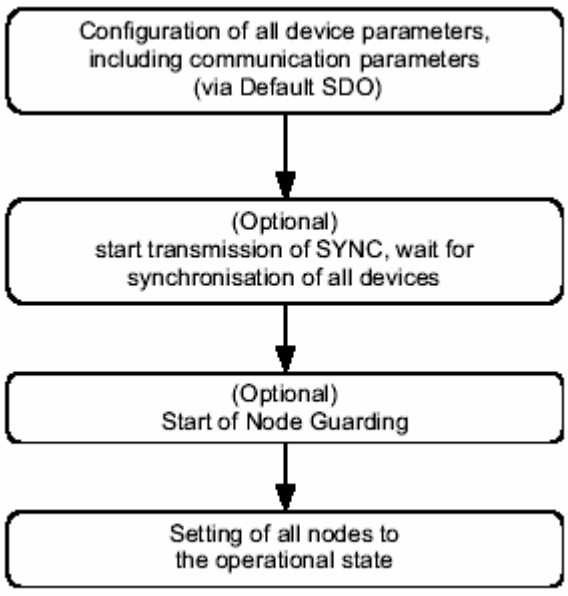


Table 31: Trigger for State Transition

(1)	At Power on the initialisation state is entered autonomously
(2)	Initialisation finished - enter PRE-OPERATIONAL automatically
(3),(6)	Start_Remote_Node indication
(4),(7)	Enter_PRE-OPERATIONAL_State indication
(5),(8)	Stop_Remote_Node indication
(9),(10),(11)	Reset_Node indication
(12),(13),(14)	Reset_Communication indication

8.2 INITIALISATION PROCEDURE


Configuration of all device parameters, including communication parameters (via Default SDO)
(Optional) start transmission of SYNC, wait for synchronisation of all devices
(Optional) Start of Node Guarding
Setting of all nodes to the operational state

9 OBJECT DESCRIPTION

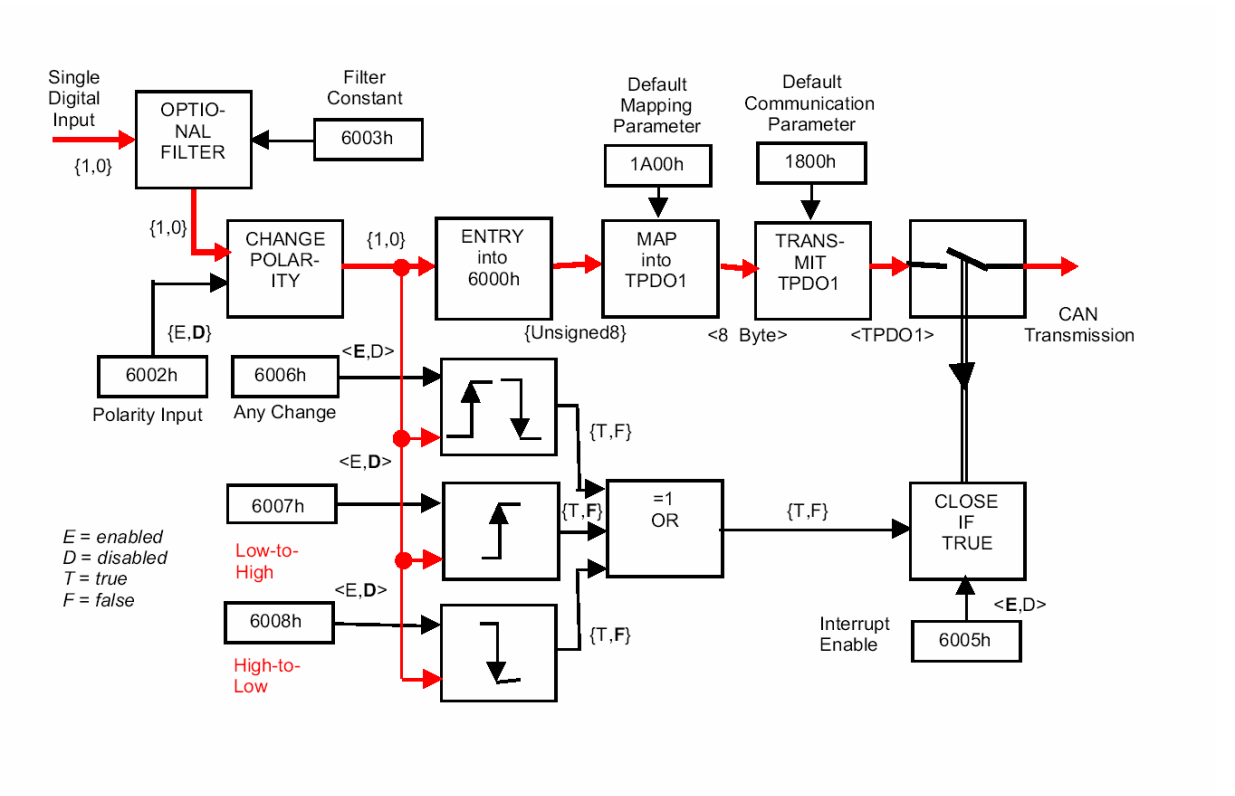
9.1 Digital Input Module

There are different access methods defined.

The following table lists the objects for 8-bit access.

Index	Object Code	Name	Data Type
6000h	Array	Read State 8 Input Lines	Unsigned8
6001h	-	Reserved	-
6002h	Array	Polarity 8 Input Lines	Unsigned8
6003h	Array	Filter Constant 8 Input Lines (Not Implemented)	Unsigned8
6004h	-	Reserved	-
6005h	Var	Enable Digital Input Interrupts	Unsigned8
6006h	Array	Input Interrupt Mask 8 – any change	Unsigned8
6007h	Array	Input Interrupt Mask 8 – low to high	Unsigned8
6008h	Array	Input Interrupt Mask 8 – high to low	Unsigned8

The Figure shows the relationship between the digital input objects for an 8-bit access.



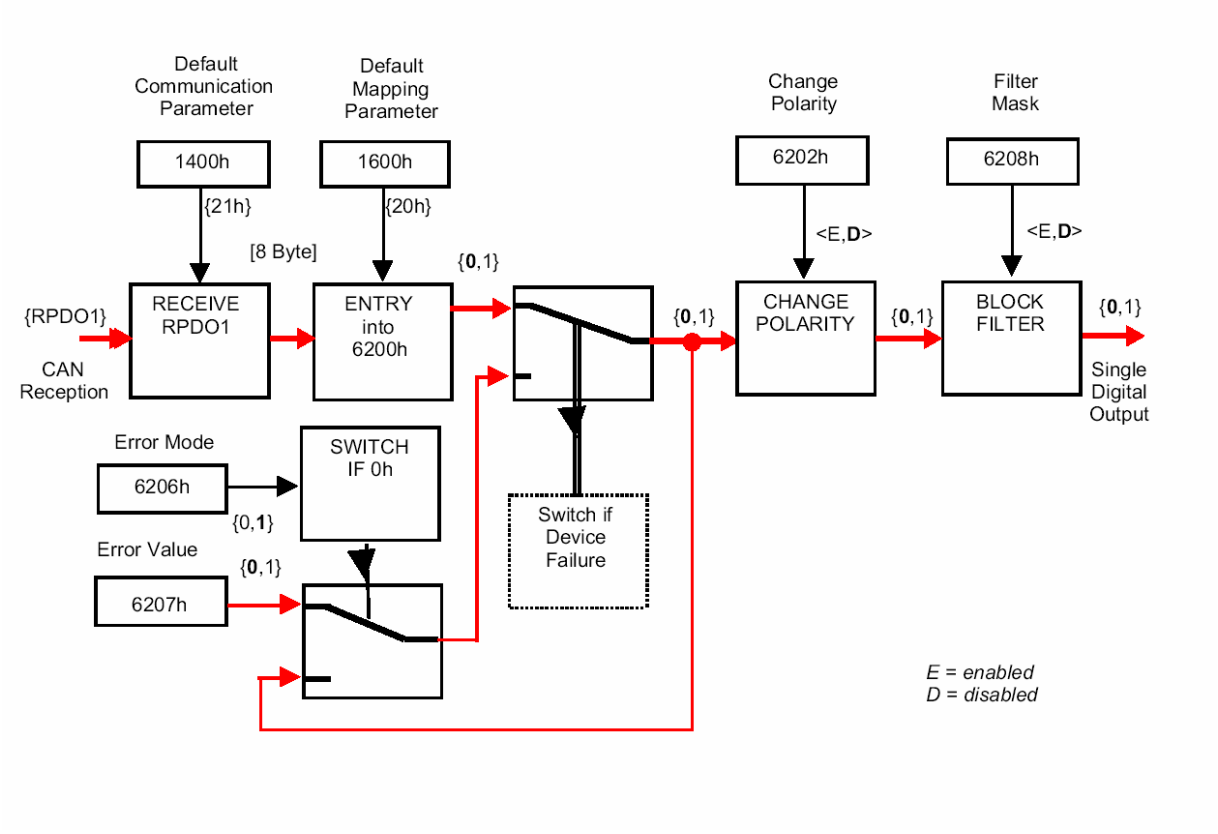
9.2 Digital Output Module

There are different access methods defined.

The following table lists the objects for 8-bit access.

Index	Object Code	Name	Data Type
6200h	Array	Write State 8 Output Lines	Unsigned8
6201h	-	Reserved	-
6202h	Array	Polarity 8 Output Lines	Unsigned8
6203h	-	Reserved	-
6204h	-	Reserved	-
6205h	-	Reserved	-
6206h	Array	Fault Mode 8 Output Lines	Unsigned8
6207h	Array	Fault State 8 Output Lines	Unsigned8
6208h	Array	Filter Constant 8 Output Lines (Not Implemented)	Unsigned8

The Figure shows the relationship between the digital output objects for an 8-bit access.



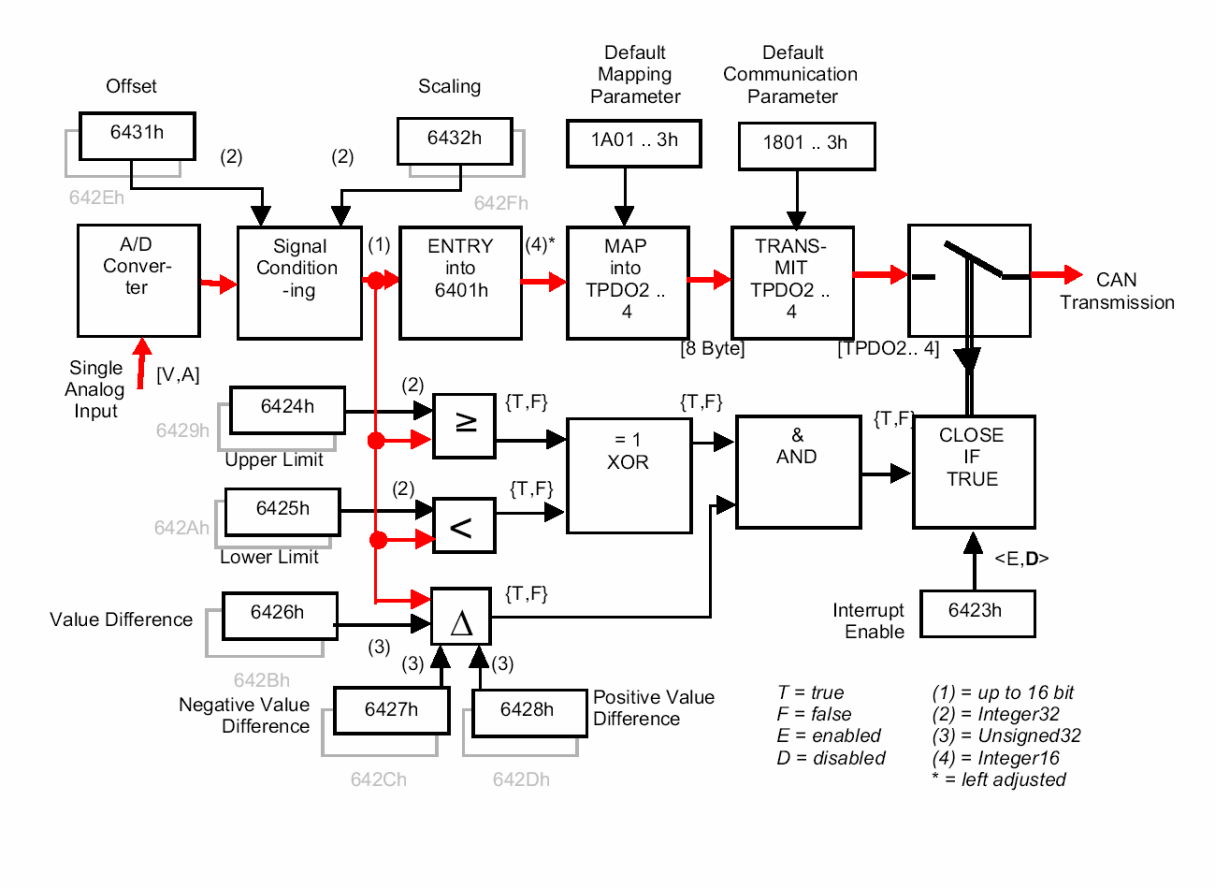
9.3 Analogue Input Module

There are different access methods defined.

The following table lists the objects for 16-bit access.

Index	Object Code	Name	Data Type
6401h	Array	Read Analog Input 12 Bits	Integer16
6421h	Array	Analog Input Interrupt Trigger Selection	Unsigned8
6422h	Array	Analog Interrupt Source	Unsigned32
6423h	Var	Global Analog Interrupt Enable	Unsigned8
6424h	Array	Analog Input Interrupt Upper Limit	Integer32
6425h	Array	Analog Input Interrupt Lower Limit	Integer32
6426h	Array	Analog Input Interrupt Delta	Integer32

The Figure shows the relationship between the analogue input objects for a 16-bit access.



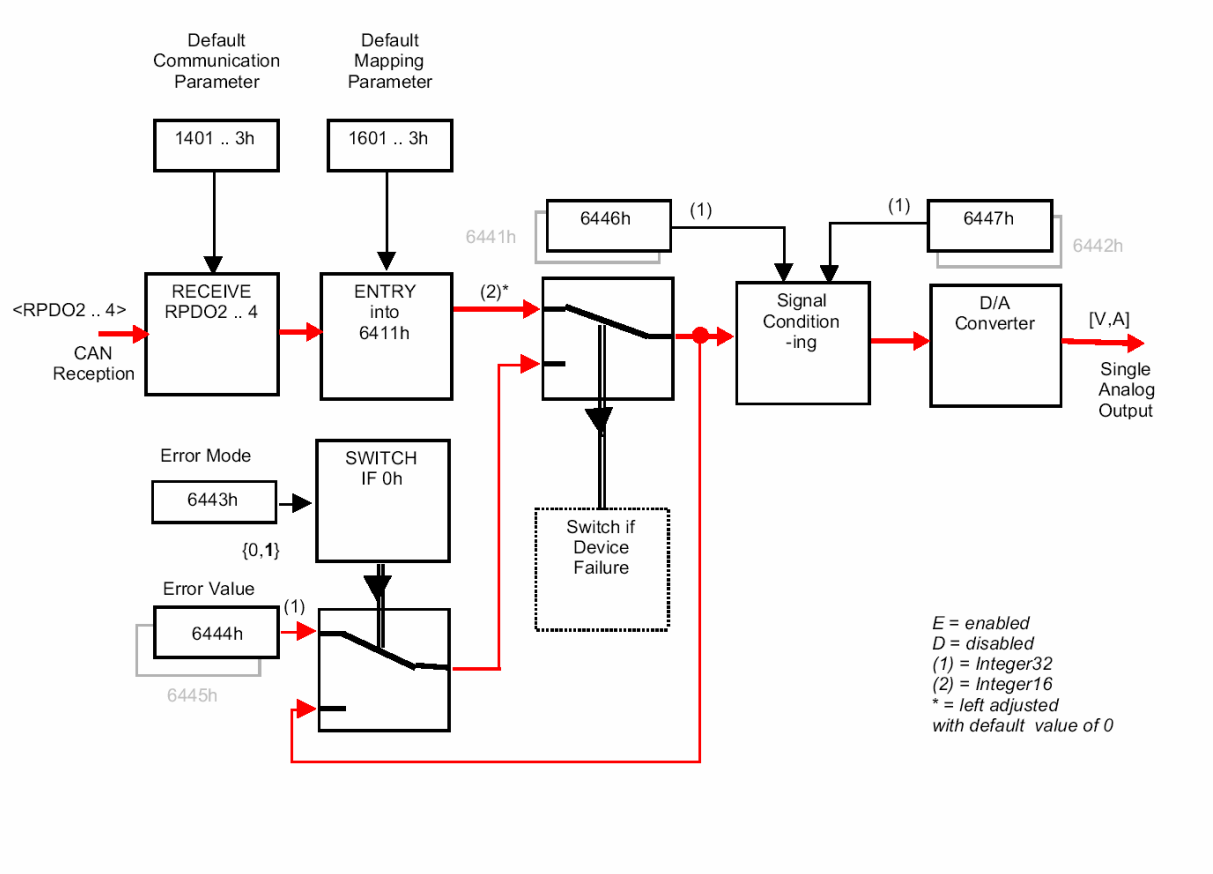
9.4 Analogue Output Module

There are different access methods defined.

The following table lists the objects for 16-bit access.

Index	Object Code	Name	Data Type
6411h	Array	Write Analog Output 12 Bits	Integer16
6443h	Array	Analog Output Fault Mode	Unsigned8
6444h	Array	Default Analog Output Fault State unconverted	Intgerer32

The Figure shows the relationship between the analogue input objects for a 16-bit access.



10 OBJECT DICTIONARY

10.1 GENRAL INFORMATION OBJECTS

10.1.1 – Object 1000h: Device Type

The device type specifies the kind of device. The lower 16 bit contains the device profile number and the upper 16 bit additional information.

INDEX	**1000h**
NAME	Device Type
Object Code	VAR
Data Type	Unsigned32
Access	RO
PDO Mapping	No
Default Value	0x000F0191

10.1.2 – Object 1001h: Error Register

The error register is a field of 8 bits, each for a certain error type. If an error occurs the bit has to be set.

INDEX	**1001h**
NAME	Error Register
Object Code	VAR
Data Type	Unsigned8
Access	RO
PDO Mapping	No
Default Value	0x00

Bit Number	**Description**
0	Generic Error
1	
2	
3	
4	Communication error (overrun, error state)
5	device profile specific
6	Reserved
7	manufacturer specific

10.1.3 – Object 1003h: Pre-defined Error Field

This object holds errors that have occurred on the device and have been signaled via Emergency Object. It is an error history. Writing to sub index 0 deletes the entire error history.

INDEX	**1003h**
NAME	Pre-defined Error Field
Object Code	ARRAY
Number of Elements	9

SUB-INDEX	**0**
NAME	Number of Errors
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x00000000

SUB-INDEX	**1-8**
NAME	Standard Error Field 1-8
Data Type	Unsigned32
Access	RO
PDO Mapping	No
Default Value	0x00000000

10.1.4 – Object 1008h: Manufacturer Device Name

Contains the device name.

INDEX	1008h
NAME	Manufacturer Device Name
Object Code	VAR
Data Type	Visible String
Access	RO
PDO Mapping	No
Default Value	CANOPEN-16DI-16DO-6AIx-4AOx-2E 1)

1) Cf. to the "IO Module Configuration table".

10.1.5 – Object 1009h: Manufacturer Hardware Version

Contains the device hardware version.

INDEX	1009h
NAME	Manufacturer Hardware version
Object Code	VAR
Data Type	Visible String
Access	RO
PDO Mapping	No

10.1.6 – Object 100Ah: Manufacturer Software Version

Contains the device software version.

INDEX	100Ah
NAME	Manufacturer Software version
Object Code	VAR
Data Type	Visible String
Access	RO
PDO Mapping	No

10.1.7 – Object 1017h: Producer Heartbeat time

The producer heartbeat time defines the cycle time of the heartbeat. If the time is 0 it is not used. The time has to be a multiple of 1 msec

INDEX	1017h
NAME	Producer Heartbeat time
Object Code	VAR
Data Type	Unsigned16
Access	RW
PDO Mapping	No
Default Value	0x0000

10.1.8 – Object 1018h: Identity Object

This object contains general information about the device.
Sub-Index 1 contains a unique value allocated to each manufacturer.
Sub-Index 2 identifies the manufacturer specific product code (device version).
Sub-Index 3 contains the revision number. Bit 31-16 is the major revision number and Bit 15-0 the minor revision number.
Sub-Index 4 identified a manufacturer specific serial number.

INDEX	1018h
NAME	Identity Object
Object Code	ARRAY
Number of Elements	4

SUB-INDEX	1
NAME	Vendor ID
Data Type	Unsigned32

Access	RO
PDO Mapping	No
Default Value	0x00000000

SUB-INDEX	**2**
NAME	Product Code
Data Type	Unsigned32
Access	RO
PDO Mapping	No
Default Value	0x00000000

SUB-INDEX	**3**
NAME	Revision Number
Data Type	Unsigned32
Access	RO
PDO Mapping	No
Default Value	0x00000000

SUB-INDEX	**4**
NAME	Serial Number
Data Type	Unsigned32
Access	RO
PDO Mapping	No
Default Value	0x00000000

10.2 SYNC OBJECTS

10.2.1 – Object 1005h: COB-ID SYNC

COB-ID of the Synchronization object. If bit 31 is set the device consumes SYNC message and if bit 30 is set the device produce SYNC message. The meaning of other bits is equal to the other communication objects.

INDEX	**10058h**
NAME	COB-ID SYNC
Object Code	VAR
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x80000080

10.2.2 – Object 1006h: Communication Cycle Period

This entry defines the communication cycle period in µs. It is 0, if not used.

INDEX	**1006h**
NAME	Communication Cycle Period
Object Code	VAR
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x00000000

10.2.3 – Object 1007h: Synchronous Windows Length

It contains the length of the time window for synchronous messages in µs. It is 0, if not used.

INDEX	**1007h**
NAME	Synchronous Windows Length
Object Code	VAR
Data Type	Visible String
Access	RW
PDO Mapping	No
Default Value	0x00000000

10.3 EMERGENCY OBJECTS

10.3.1 – Object 1014h: COB-ID EMCY

COB-ID used for emergency message (Emergency Server).

INDEX	**1014h**
NAME	COB-ID EMCY
Object Code	VAR
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	80h + Node-ID

10.3.2 – Object 1015h: Inhibit Time Emergency

Inhibit Time used for emergency message (Emergency Server).
The time has to be a multiple of 100 msec.

INDEX	**1015h**
NAME	Inhibit Time Emergency
Object Code	VAR
Data Type	Unsigned16
Access	RW
PDO Mapping	No
Default Value	0x0000

10.4 PDO OBJECTS

10.4.1 – Object 1400h: Receive PDO Communication Parameter

It contains the communication parameters of the first PDO the device is able to receive.
Sub-index 0 contains the number of PDO-parameters implemented. Sub index 1 describes the COB-ID. If bit 31 is set the PDO is disabled. The transmission mode is defined by sub-index 2.
An inhibit time can be defined on sub-index 3 in 100 µs.

INDEX	**1400h**
NAME	1st Receive PDO Communication Parameter (RPDO1)
Object Code	ARRAY
Number of Elements	3

SUB-INDEX	**1**
NAME	COB-ID
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x200h + Node-ID

SUB-INDEX	**2**
NAME	Transmission Type
Data Type	Unsigned8
Access	RW
PDO Mapping	No
Default Value	0x01

SUB-INDEX	**3**
NAME	Inhibit Time
Data Type	Unsigned16
Access	RW
PDO Mapping	No
Default Value	0x0000

10.4.2 – Object 1401h: Receive PDO Communication Parameter

It contains the communication parameters of the first PDO the device is able to receive.
Sub-index 0 contains the number of PDO-parameters implemented. Sub index 1 describes the COB-ID. If bit 31 is set the PDO is disabled. The transmission mode is defined by sub-index 2.
An inhibit time can be defined on sub-index 3 in 100 µs.

INDEX	**1401h**
NAME	2nd Receive PDO Communication Parameter (RPDO2)
Object Code	ARRAY
Number of Elements	3

SUB-INDEX	**1**
NAME	COB-ID
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x300h + Node-ID

SUB-INDEX	**2**
NAME	Transmission Type
Data Type	Unsigned8
Access	RW
PDO Mapping	No
Default Value	0x01

SUB-INDEX	**3**
NAME	Inhibit Time
Data Type	Unsigned16
Access	RW

PDO Mapping	No
Default Value	0x0000

10.4.3 – Object 1404h: Receive PDO Communication Parameter

It contains the communication parameters of the first PDO the device is able to receive.
Sub-index 0 contains the number of PDO-parameters implemented. Sub index 1 describes the COB-ID. If bit 31 is set the PDO is disabled. The transmission mode is defined by sub-index 2.
An inhibit time can be defined on sub-index 3 in 100 µs.

!!Only first 4 pdo have predefined cob!!

INDEX	**1404h**
NAME	5 Receive PDO Communication Parameter (RPDO5)
Object Code	ARRAY
Number of Elements	3

SUB-INDEX	**1**
NAME	COB-ID
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x500h + Node-ID

SUB-INDEX	**2**
NAME	Transmission Type
Data Type	Unsigned8
Access	RW
PDO Mapping	No
Default Value	0x01

SUB-INDEX	**3**
NAME	Inhibit Time
Data Type	Unsigned16
Access	RW
PDO Mapping	No
Default Value	0x0000

10.4.4 – Object 1600h: Receive PDO Mapping Parameter

It contains the mapping parameters of the first PDO the device is able to receive.
Sub-index 0 contains the number of the mapped data objects. All further entries define the data by its index, sub-index and length.

INDEX	**1600h**
NAME	1st Receive PDO Mapping Parameter (RPDO1)
Object Code	ARRAY
Number of Elements	1..2

SUB-INDEX	**1**
NAME	1st mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x62000108 Digital Output 1-8

SUB-INDEX	**2**
NAME	2nd mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x62000208 Digital Output 9-16

10.4.5 – Object 1601h: Receive PDO Mapping Parameter

It contains the mapping parameters of the first PDO the device is able to receive.
Sub-index 0 contains the number of the mapped data objects. All further entries define the data by its index, sub-index and length.

INDEX	**1601h**
NAME	2nd Receive PDO Mapping Parameter (RPDO2)
Object Code	ARRAY
Number of Elements	1..4

SUB-INDEX	**1**
NAME	1st mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x64110110 Analog Output 1

SUB-INDEX	**2**
NAME	2nd mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x64110210 Analog Output 2

SUB-INDEX	**3**
NAME	3rd mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x64110310 Analog Output 3

SUB-INDEX	**4**
NAME	4 mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x64110410 Analog Output 4

10.4.6 – Object 1604h: Receive PDO Mapping Parameter

It contains the mapping parameters of the first PDO the device is able to receive.
Sub-index 0 contains the number of the mapped data objects. All further entries define the data by it's index, sub-index and length.

INDEX	**1604h**
NAME	5 Receive PDO Mapping Parameter (RPDO5)
Object Code	ARRAY
Number of Elements	1..2

SUB-INDEX	**1**
NAME	1st mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x20000208 Control Axis 1 Byte

SUB-INDEX	**2**
NAME	2nd mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x20000408 Control Axis 2 Byte

10.4.7 – Object 1800h: Transmit PDO Communication Parameter

It contains the communication parameters of the first PDO the device is able to transmit.
Sub-index 0 contains the number of PDO-parameters implemented. Sub index 1 describes the COB-ID. If bit 31 is set the PDO is disabled. The transmission mode is defined by sub-index 2.
An inhibit time can be defined on sub-index 3 in 100 µs.

INDEX	**1800h**
NAME	1st Transmit PDO Communication Parameter (TPDO1)
Object Code	ARRAY
Number of Elements	3

SUB-INDEX	**1**
NAME	COB-ID
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x180h + Node-ID

SUB-INDEX	**2**
NAME	Transmission Type
Data Type	Unsigned8
Access	RW
PDO Mapping	No
Default Value	0x01

SUB-INDEX	**3**
NAME	Inhibit Time
Data Type	Unsigned16
Access	RW
PDO Mapping	No
Default Value	0x0000

10.4.8 – Object 1801h: Transmit PDO Communication Parameter

It contains the communication parameters of the second PDO the device is able to transmit.
Sub-index 0 contains the number of PDO-parameters implemented. Sub index 1 describes the COB-ID. If bit 31 is set the PDO is disabled. The transmission mode is defined by sub-index 2.
An inhibit time can be defined on sub-index 3 in 100 µs.

INDEX	**1801h**
NAME	2nd Transmit PDO Communication Parameter (TPDO2)
Object Code	ARRAY
Number of Elements	3

SUB-INDEX	**1**
NAME	COB-ID
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x280h + Node-ID

SUB-INDEX	**2**
NAME	Transmission Type
Data Type	Unsigned8
Access	RW
PDO Mapping	No
Default Value	0x01

SUB-INDEX	**3**
NAME	Inhibit Time
Data Type	Unsigned16
Access	RW
PDO Mapping	No

10.4.9 – Object 1802h: Transmit PDO Communication Parameter

It contains the communication parameters of the actual PDO the device is able to transmit.
Sub-index 0 contains the number of PDO-parameters implemented. Sub index 1 describes the COB-ID. If bit 31 is set the PDO is disabled. The transmission mode is defined by sub-index 2.
An inhibit time can be defined on sub-index 3 in 100 µs.

INDEX	**1802h**
NAME	3rd Transmit PDO Communication Parameter (TPDO3)
Object Code	ARRAY
Number of Elements	3

SUB-INDEX	**1**
NAME	COB-ID
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x380h + Node-ID

SUB-INDEX	**2**
NAME	Transmission Type
Data Type	Unsigned8
Access	RW
PDO Mapping	No
Default Value	0x01

SUB-INDEX	**3**
NAME	Inhibit Time
Data Type	Unsigned16
Access	RW
PDO Mapping	No

10.4.10 – Object 1804h: Transmit PDO Communication Parameter

It contains the communication parameters of the actual PDO the device is able to transmit.
Sub-index 0 contains the number of PDO-parameters implemented. Sub index 1 describes the COB-ID. If bit 31 is set the PDO is disabled. The transmission mode is defined by sub-index 2.
An inhibit time can be defined on sub-index 3 in 100 µs.

!!Only first 4 pdo have predefined cob!!

INDEX	**1804h**
NAME	5 Transmit PDO Communication Parameter (TPDO5)
Object Code	ARRAY
Number of Elements	3

SUB-INDEX	**1**
NAME	COB-ID
Data Type	Unsigned32
Access	RW
PDO Mapping	No

SUB-INDEX	**2**
NAME	Transmission Type
Data Type	Unsigned8
Access	RW
PDO Mapping	No
Default Value	0x01

SUB-INDEX	**3**
NAME	Inhibit Time
Data Type	Unsigned16
Access	RW
PDO Mapping	No

10.4.11 – Object 1805h: Transmit PDO Communication Parameter

It contains the communication parameters of the actual PDO the device is able to transmit.
Sub-index 0 contains the number of PDO-parameters implemented. Sub index 1 describes the COB-ID. If bit 31 is set the PDO is disabled. The transmission mode is defined by sub-index 2.
An inhibit time can be defined on sub-index 3 in 100 µs.

!!Only first 4 pdo have predefined cob!!

INDEX	**1805h**
NAME	6 Transmit PDO Communication Parameter (TPDO6)
Object Code	ARRAY
Number of Elements	3

SUB-INDEX	**1**
NAME	COB-ID
Data Type	Unsigned32
Access	RW
PDO Mapping	No

SUB-INDEX	**2**
NAME	Transmission Type
Data Type	Unsigned8
Access	RW
PDO Mapping	No
Default Value	0x01

SUB-INDEX	**3**
NAME	Inhibit Time
Data Type	Unsigned16
Access	RW
PDO Mapping	No

10.4.12 – Object 1A00h: Transmit PDO Mapping Parameter

It contains the mapping parameter for the PDOs the device is able to transmit.
Sub-index 0 contains the number of the mapped data objects. All further entries define the data by its index, sub-index and length.
The structure of a mapping entry is:

INDEX	**1A00h**
NAME	1st Transmit PDO Mapping Parameter (TPDO1)
Object Code	ARRAY
Number of Elements	1..2

SUB-INDEX	**1**
NAME	1st mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x60000108 Digital Input 1-8

SUB-INDEX	**2**
NAME	2nd mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x60000208 Digital Input 9-16

10.4.13 – Object 1A01h: Transmit PDO Mapping Parameter

It contains the mapping parameter for the PDOs the device is able to transmit.
Sub-index 0 contains the number of the mapped data objects. All further entries define the data by its index, sub-index and length.
The structure of a mapping entry is:

INDEX	**1A01h**
NAME	2nd Transmit PDO Mapping Parameter (TPDO2)
Object Code	ARRAY
Number of Elements	1..4

SUB-INDEX	**1**
NAME	1st mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x64010110 Analog Input 1

SUB-INDEX	**2**
NAME	2nd mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x64010210 Analog Input 2

SUB-INDEX	**3**
NAME	3rd mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x64010310 Analog Input 3

SUB-INDEX	**4**
NAME	4 mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x64010410 Analog Input 4

10.4.14 – Object 1A02h: Transmit PDO Mapping Parameter

It contains the mapping parameter for the PDOs the device is able to transmit.
Sub-index 0 contains the number of the mapped data objects. All further entries define the data by it's index, sub-index and length.
The structure of a mapping entry is:

INDEX	**1A02h**
NAME	3rd Transmit PDO Mapping Parameter (TPDO3)
Object Code	ARRAY
Number of Elements	1..2

SUB-INDEX	**1**
NAME	1st mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x64010510 Analog Input 5

SUB-INDEX	**2**
NAME	2nd mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No

Default Value	0x64010610 Analog Input 6

10.4.15 – Object 1A04h: Transmit PDO Mapping Parameter

It contains the mapping parameter for the PDOs the device is able to transmit.
Sub-index 0 contains the number of the mapped data objects. All further entries define the data by its index, sub-index and length.
The structure of a mapping entry is:

INDEX	**1A04h**
NAME	5 Transmit PDO Mapping Parameter (TPDO5)
Object Code	ARRAY
Number of Elements	1..3

SUB-INDEX	**1**
NAME	1st mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x20000108 Status Axis 1

SUB-INDEX	**2**
NAME	2nd mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x20200120 Position Axis 1

SUB-INDEX	**3**
NAME	3rd mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x20300110 Speed Axis 1

10.4.16 – Object 1A05h: Transmit PDO Mapping Parameter

It contains the mapping parameter for the PDOs the device is able to transmit.
Sub-index 0 contains the number of the mapped data objects. All further entries define the data by its index, sub-index and length.
The structure of a mapping entry is:

INDEX	**1A05h**
NAME	6 Transmit PDO Mapping Parameter (TPDO6)
Object Code	ARRAY
Number of Elements	1..3

SUB-INDEX	**1**
NAME	1st mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x20000308 Status Axis 2

SUB-INDEX	**2**
NAME	2nd mapped Object
Data Type	Unsigned32
Access	RW
PDO Mapping	No
Default Value	0x20200220 Position Axis 2

SUB-INDEX	**3**
NAME	3rd mapped Object
Data Type	Unsigned32

Access	RW
PDO Mapping	No
Default Value	0x20300210 Speed Axis 2

10.5 MANUFACTURER DEVICE PROFILE

10.5.1 – Object 2000h: Operating Parameters Axis

This object contains the Status and Control Byte of Axis 1 & 2.

INDEX	**2000h**
NAME	Operating Parameters Axis
Object Code	ARRAY
Number of Elements	4

SUB-INDEX	**1**
NAME	Status Byte Axis 1
Data Type	Unsigned8
Access	RW
PDO Mapping	Yes

SUB-INDEX	**2**
NAME	Control Byte Axis 1
Data Type	Unsigned8
Access	RW
PDO Mapping	Yes

SUB-INDEX	**3**
NAME	Status Byte Axis 2
Data Type	Unsigned8
Access	RW
PDO Mapping	Yes

SUB-INDEX	**4**
NAME	Control Byte Axis 2
Data Type	Unsigned8
Access	RW
PDO Mapping	Yes

Satus Byte for Axis 1 (S1: Index:0x2000 Sub-Index:0x1)

Bit	**Description**	**Function**	
0	LATC_VAL	Acknowledge bit for EN_LATC (C1.0)	
		Latch Mode:	This bit is set with a positive edge at input I (Encoder Index Pulse)
			It is reset when EN_LATC is reset
		Preload Mode:	This bit is set with a positive edge at input I (Encoder Index Pulse)
			It is reset when EN_LATC is reset
1	LATC_EXT_VAL	Acknowledge bit for EN_LATC_EXT (C1.1)	
		Latch Mode:	This bit is set with a positive edge at input I1 (Input Connector B1)
			It is reset when EN_LATC is reset
		Preload Mode:	This bit is set with a positive edge at input I1 (Input Connector B1)
			It is reset when EN_LATC is reset
2	CNT_SET_ACK	Acknowledge bit for CNT_SET (C1.2)	
		It is reset when CNT_SET is reset	
3	UNDERFLOW	UNDERFLOW=1 with a counter overflow of 0x00000000 to 0xFFFFFFFF	
		UNDERFLOW=0 if counter < 0xAAAAAAAA	
		UNDERFLOW=0 if positive edge on ResetUnderflow (C1.3)	
		UNDERFLOW=0 if OVERFLOW=1	
4	OVERFLOW	OVERFLOW=1 with a counter overflow of 0xFFFFFFFF to 0x00000000	
		OVERFLOW=0 if counter < 0x55555555	
		OVERFLOW=0 if positive edge on ResetOverflow (C1.4)	
		OVERFLOW=0 if UNDERFLOW=1	
5	Not used		
6	Not used		
7	Not used		

Control Byte for Axis 1 (C1: Index:0x2000 Sub-Index:0x2)

Bit	Description	Function	
0	EN_LATC_VAL	The Encoder zero mark is released	
		Latch Mode:	With a positive edge at input I (Encoder Index Pulse) the counter reading
			is transferred to the latch register (Object index 0x2010 Sub-index 1)
		Preload Mode:	With a positive edge at input I (Encoder Index Pulse) the counter is
			loaded with the set value (Object index 0x2010 Sub-index 1)
		The confirmation is de-selected for the negative edge of EN_LATC	
1	EN_LATC_EXT	The external latch input is released	
		Latch Mode:	With a positive edge at input I1 (Input Connector B1) the counter reading
			is transferred to the latch register (Object index 0x2010 Sub-index 1)
		Preload Mode:	With a positive edge at input I1 (Input Connector B1) the counter is
			loaded with the set value (Object index 0x2010 Sub-index 1)
		The confirmation is de-selected for the negative edge of EN_LATC_EXT	
2	CNT_SET	With a positive edge, the counter is initialized on the set value (Object index 0x2010 Sub-index 1)	
3	RESET_UNDERFLOW	With a positive edge the status bit UNDERFLOW (S1.4) is reset	
4	RESET_OVERFLOW	With a positive edge the status bit OVERFLOW (S1.5) is reset	
5	Not used		
6	OPMODE	0=Latch Mode	The counter is latched by a trigger signal
		1=Preload Mode	The counter is loaded with the set value by a trigger signal
7	Not used		

Satus Byte for Axis 2 (S2: Index:0x2000 Sub-Index:0x3)

Bit	Description	Function	
0	LATC_VAL	Acknowledge bit for EN_LATC (C2.0)	
		Latch Mode:	This bit is set with a positive edge at input I (Encoder Index Pulse)
			It is reset when EN_LATC is reset
		Preload Mode:	This bit is set with a positive edge at input I (Encoder Index Pulse)
			It is reset when EN_LATC is reset
1	LATC_EXT_VAL	Acknowledge bit for EN_LATC_EXT (C2.1)	
		Latch Mode:	This bit is set with a positive edge at input I2 (Input Connector B1)
			It is reset when EN_LATC is reset
		Preload Mode:	This bit is set with a positive edge at input I2 (Input Connector B1)
			It is reset when EN_LATC is reset
2	CNT_SET_ACK	Acknowledge bit for CNT_SET (C2.2)	
		It is reset when CNT_SET is reset	
3	UNDERFLOW	UNDERFLOW=1 with a counter overflow of 0x00000000 to 0xFFFFFFFF	
		UNDERFLOW=0 if counter < 0xAAAAAAAA	
		UNDERFLOW=0 if positive edge on ResetUnderflow (C2.3)	
		UNDERFLOW=0 if OVERFLOW=1	
4	OVERFLOW	OVERFLOW=1 with a counter overflow of 0xFFFFFFFF to 0x00000000	
		OVERFLOW=0 if counter < 0x55555555	
		OVERFLOW=0 if positive edge on ResetOverflow (C2.4)	
		OVERFLOW=0 if UNDERFLOW=1	
5	Not used		
6	Not used		
7	Not used		

Control Byte for Axis 2 (C2: Index:0x2000 Sub-Index:0x4)

Bit	Description	Function	
0	EN_LATC_VAL	The Encoder zero mark is released	
		Latch Mode:	With a positive edge at input I (Encoder Index Pulse) the counter reading
			is transferred to the latch register (Object index 0x2010 Sub-index 2)
		Preload Mode:	With a positive edge at input I (Encoder Index Pulse) the counter is
			loaded with the set value (Object index 0x2010 Sub-index 2)
		The confirmation is de-selected for the negative edge of EN_LATC	
1	EN_LATC_EXT	The external latch input is released	
		Latch Mode:	With a positive edge at input I2 (Input Connector B1) the counter reading
			is transferred to the latch register (Object index 0x2010 Sub-index 2)
		Preload Mode:	With a positive edge at input I2 (Input Connector B1) the counter is
			loaded with the set value (Object index 0x2010 Sub-index 2)
		The confirmation is de-selected for the negative edge of EN_LATC_EXT	
2	CNT_SET	With a positive edge, the counter is initialized on the set value (Object index 0x2010 Sub-index 2)	
3	RESET_UNDERFLOW	With a positive edge the status bit UNDERFLOW (S2.4) is reset	
4	RESET_OVERFLOW	With a positive edge the status bit OVERFLOW (S2.5) is reset	
5	Not used		
6	OPMODE	0=Latch Mode	The counter is latched by a trigger signal
		1=Preload Mode	The counter is loaded with the set value by a trigger signal
7	Not used		

10.5.2 – Object 2001h: Overflow Counter

This parameter is the internal overflow counter. (16->32bits overflow counter)

INDEX	2001h
NAME	Overflow Counter
Object Code	ARRAY
Number of Elements	2

SUB-INDEX	1
NAME	Overflow Counter Axis 1
Data Type	Integer32
Access	RO
PDO Mapping	No

SUB-INDEX	2
NAME	Overflow Counter Axis 2
Data Type	Integer32
Access	RO
PDO Mapping	No

10.5.3 – Object 2010h: Preset Value for Multi Sensor Device 32Bits

This object contains the Preset position value for Axis 1 & Axis 2. The Data width is 32Bits

INDEX	2010h
NAME	Preset Value for Multi Sensor Device 32Bits
Object Code	ARRAY
Number of Elements	2

SUB-INDEX	1
NAME	Preset / Latch Value Axis 1
Data Type	Unsigned32
Access	RW
PDO Mapping	Yes

SUB-INDEX	2
NAME	Preset / Latch Value Axis 2
Data Type	Unsigned32
Access	RW
PDO Mapping	Yes

10.5.4 – Object 2020h: Position for Multi Sensor Devices 32Bits

This object contains the Output Position value for Axis 1 & Axis 2. The Data width is 32Bits

INDEX	2020h
NAME	Position for Multi Sensor Devices 32Bits
Object Code	ARRAY
Number of Elements	2

SUB-INDEX	1
NAME	Position Value Axis 1
Data Type	Unsigned32
Access	RO
PDO Mapping	Yes

SUB-INDEX	2
NAME	Position Value Axis 2
Data Type	Unsigned32
Access	RO
PDO Mapping	Yes

10.5.5 – Object 2030h: Speed Value 16Bits

This object contains the Output speed value for Axis 1 & Axis 2. The Data width is 16Bits

INDEX	**2030h**
NAME	Speed Value 16Bits
Object Code	ARRAY
Number of Elements	2

SUB-INDEX	**1**
NAME	Speed Value Axis 1
Data Type	Integer16
Access	R=
PDO Mapping	Yes

SUB-INDEX	**2**
NAME	Speed Value Axis 2
Data Type	Integer16
Access	RO
PDO Mapping	Yes

10.6 DEVICE PROFILE FOR GENERIC IO MODULE

10.6.1 – Object 6000h: Read State 8 Input Lines

Reads a group of 8 inputs lines as a byte of information.

INDEX	**6000h**
NAME	Read State 8 Input Lines
Object Code	ARRAY
Number of Elements	2

SUB-INDEX	**0**
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	**1**
NAME	Digital Inputs 1-8
Data Type	Unsigned8
Access	RO
PDO Mapping	Yes

SUB-INDEX	**2**
NAME	Digital Inputs 9-16
Data Type	Unsigned8
Access	RO
PDO Mapping	Yes

10.6.2 – Object 6002h: Polarity 8 Input Lines

Defines the polarity of a group of 8 input lines.

INDEX	**6002h**
NAME	Polarity 8 Input Lines
Object Code	ARRAY
Number of Elements	2

SUB-INDEX	**0**
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	**1**
NAME	Polarity for Digital Inputs 1-8
Data Type	Unsigned8
Access	RW
PDO Mapping	No

SUB-INDEX	**2**
NAME	Polarity for Digital Inputs 9-16
Data Type	Unsigned8
Access	RW
PDO Mapping	No

10.6.3 – Object 6005h: Enable Digital input Interrupts

Globally enable or disable input interrupts.

INDEX	**6005h**
NAME	Enable Digital Input Interrupts
Object Code	VAR
Data Type	Unsigned8
Access	RW
PDO Mapping	No
Default Value	0x00

10.6.4 – Object 6006h: Input Interrupt Mask 8 – any change

Determines which input port lines activate an interrupt. Done for groups of 8 lines and for any change of a digital input line. By default, every input activates an interrupt.

INDEX	**6006h**
NAME	Input Interrupt Mask 8 – any change
Object Code	ARRAY
Number of Elements	2

SUB-INDEX	**0**
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	**1**
NAME	Input Interrupt Mask 8 – any change for Digital Inputs 1-8
Data Type	Unsigned8
Access	RW
PDO Mapping	No

SUB-INDEX	**2**
NAME	Input Interrupt Mask 8 – any change for Digital Inputs 9-16
Data Type	Unsigned8
Access	RW
PDO Mapping	No

10.6.5 – Object 6007h: Input Interrupt Mask 8 – low to high

Determines which input port lines activate an interrupt. Done for Groups of 8 lines and for a change from low to high of a digital input line. The values are in 'OR' connection to the values of object 6006h.

INDEX	**6007h**
NAME	Input Interrupt Mask 8 – low to high
Object Code	ARRAY
Number of Elements	2

SUB-INDEX	**0**
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	**1**
NAME	Input Interrupt Mask 8 – low to high for Digital Inputs 1-8
Data Type	Unsigned8
Access	RW
PDO Mapping	No

SUB-INDEX	2
NAME	Input Interrupt Mask 8 – low to high for Digital Inputs 9-16
Data Type	Unsigned8
Access	RW
PDO Mapping	No

10.6.6 – Object 6008h: Input Interrupt Mask 8 – high to low

Determines which input port lines activate an interrupt. Done for groups of 8 lines and for a change from high to low of a digital input line. The values are in an 'OR' connection to the values of object 6006h.

INDEX	6008h
NAME	Input Interrupt Mask 8 – high to low
Object Code	ARRAY
Number of Elements	2

SUB-INDEX	0
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	1
NAME	Input Interrupt Mask 8 – high to low for Digital Inputs 1-8
Data Type	Unsigned8
Access	RW
PDO Mapping	No

SUB-INDEX	2
NAME	Input Interrupt Mask 8 – high to low for Digital Inputs 9-16
Data Type	Unsigned8
Access	RW
PDO Mapping	No

10.6.7 – Object 6020h: Read State 1 Input Line 1-16

Reads single input line information. A maximum of 16 bit inputs are addressable at one index.

INDEX	6020h
NAME	Read State 1 Input Line 1-16
Object Code	ARRAY
Number of Elements	16

SUB-INDEX	0
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	1
NAME	Digital Input 1
Data Type	Unsigned8
Access	RO
PDO Mapping	Yes

to

SUB-INDEX	16
NAME	Digital Input 16
Data Type	Unsigned8
Access	RO
PDO Mapping	Yes

10.6.8 – Object 6030h: Polarity 1 Input Line 1-16

Sets the polarity of a single input line. A maximum of 16 bit inputs are addressable at one index.

INDEX	**6030h**
NAME	Polarity 1 Input Line 1-16
Object Code	ARRAY
Number of Elements	16

SUB-INDEX	**0**
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	**1**
NAME	Polarity Digital Input 1
Data Type	Unsigned8
Access	RW
PDO Mapping	Yes

to

SUB-INDEX	**16**
NAME	Polarity Digital Input 16
Data Type	Unsigned8
Access	RW
PDO Mapping	Yes

10.6.9 – Object 6050h: Interrupt Mask 1 Input Line 1-16 – any change

Sets the interrupt mask for 'any change' for a single input line. A maximum of 16 bit inputs are addressable at one index.

INDEX	**6050h**
NAME	Interrupt Mask 1 Input Line 1-16 – any change
Object Code	ARRAY
Number of Elements	16

SUB-INDEX	**0**
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	**1**
NAME	Interrupt Mask 1 Input Line 1-16 – any change for Digital Input 1
Data Type	Unsigned8
Access	RW
PDO Mapping	Yes

to

SUB-INDEX	**16**
NAME	Interrupt Mask 1 Input Line 1-16 – any change for Digital Input 16
Data Type	Unsigned8
Access	RW
PDO Mapping	Yes

10.6.10 – Object 6060h: Interrupt Mask 1 Input Line 1-16 – low to high

Sets interrupt mask for a single input line. A maximum of 16 bit inputs are addressable at one index.

INDEX	**6060h**
NAME	Interrupt Mask 1 Input Line 1-16 – low to high
Object Code	ARRAY
Number of Elements	16

SUB-INDEX	**0**
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	**1**
NAME	Interrupt Mask 1 Input Line 1-16 – low to high for Digital Input 1
Data Type	Unsigned8
Access	RW
PDO Mapping	Yes

to

SUB-INDEX	**16**
NAME	Interrupt Mask 1 Input Line 1-16 – low to high for Digital Input 16
Data Type	Unsigned8
Access	RW
PDO Mapping	Yes

10.6.11 – Object 6070h: Interrupt Mask 1 Input Line 1-16 – high to low

Sets interrupt mask for a single input line. A maximum of 16 bit inputs are addressable at one index.

INDEX	**6070h**
NAME	Interrupt Mask 1 Input Line 1-16 – high to low
Object Code	ARRAY
Number of Elements	16

SUB-INDEX	**0**
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	**1**
NAME	Interrupt Mask 1 Input Line 1-16 – high to low for Digital Input 1
Data Type	Unsigned8
Access	RW
PDO Mapping	Yes

to

SUB-INDEX	**16**
NAME	Interrupt Mask 1 Input Line 1-16 – high to low for Digital Input 16
Data Type	Unsigned8
Access	RW
PDO Mapping	Yes

10.6.12 – Object 6200h: Write State 8 Output Lines

Sets a group of 8 output lines as a byte of information.

INDEX	6200h
NAME	Write State 8 Output Lines
Object Code	ARRAY
Number of Elements	2

SUB-INDEX	0
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	1
NAME	Digital Outputs 1-8
Data Type	Unsigned8
Access	RW
PDO Mapping	Yes

SUB-INDEX	2
NAME	Digital Outputs 9-16
Data Type	Unsigned8
Access	RW
PDO Mapping	Yes

10.6.13 – Object 6202h: Polarity 8 Output Lines

Defines the polarity of a group of 8 output lines.

INDEX	6202h
NAME	Polarity 8 Output Lines
Object Code	ARRAY
Number of Elements	2

SUB-INDEX	0
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	1
NAME	Polarity for Digital Outputs 1-8
Data Type	Unsigned8
Access	RW
PDO Mapping	No

SUB-INDEX	2
NAME	Polarity for Digital Outputs 9-16
Data Type	Unsigned8
Access	RW
PDO Mapping	No

10.6.14 – Object 6206h: Fault Mode 8 Output Lines

Output line fault mode. This defines the default output mode on detecting a fault condition. Defined for groups of 8 lines (1 bit per line). This equals 1 if the output must revert to a predefined output state on fault detection. Default mode is that the outputs do revert to a predefined output state.

INDEX	6206h
NAME	Fault Mode 8 Output Lines
Object Code	ARRAY
Number of Elements	2

SUB-INDEX	0
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	1
NAME	Fault Mode for Digital Outputs 1-8
Data Type	Unsigned8
Access	RW
PDO Mapping	No

SUB-INDEX	2
NAME	Fault Mode for Digital Outputs 9-16
Data Type	Unsigned8
Access	RW
PDO Mapping	No

10.6.15 – Object 6207h: Fault State 8 Output Lines

Output line fault state. This defines the default output state on detecting a fault condition. Defined for groups of 8 outputs. The corresponding bit must be set in the default output line mode.

INDEX	6207h
NAME	Fault State 8 Output Lines
Object Code	ARRAY
Number of Elements	2

SUB-INDEX	0
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	1
NAME	Fault State for Digital Outputs 1-8
Data Type	Unsigned8
Access	RW
PDO Mapping	No

SUB-INDEX	2
NAME	Fault State for Digital Outputs 9-16
Data Type	Unsigned8
Access	RW
PDO Mapping	No

10.6.16 – Object 6220h: Write State 1 Output Line 1-16

Sets single output line information. A maximum of 16 bit outputs are addressable at one index.

INDEX	6220h
NAME	Write State 1 Output Line 1-16
Object Code	ARRAY
Number of Elements	16

SUB-INDEX	0
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	1
NAME	Digital Output 1
Data Type	Unsigned8
Access	RW

PDO Mapping	Yes

to

SUB-INDEX	**16**
NAME	Digital Output 16
Data Type	Unsigned8
Access	RW
PDO Mapping	Yes

10.6.17 – Object 6401h: Read Analog Input 12 Bits

Reads the value of the input channel 'n' (unconverted). Value is 12 bits wide. The value is always left adjusted.

INDEX	**6401h**
NAME	Read Analog Input 12 Bits
Object Code	ARRAY
Number of Elements	6

SUB-INDEX	**0**
NAME	Number of elements
Data Type	Integer16
Access	RO
PDO Mapping	No

SUB-INDEX	**1**
NAME	Analog Input 1
Data Type	Integer16
Access	RO
PDO Mapping	Yes

to

SUB-INDEX	**6**
NAME	Analog Input 6
Data Type	Integer16
Access	RO
PDO Mapping	Yes

10.6.18 – Object 6411h: Write Analog Output 12 Bits

Writes the value to the output channel 'n' (unconverted). Value is 12 bits wide. The value is always left adjusted.

INDEX	**6411h**
NAME	Write Analog Output 12 Bits
Object Code	ARRAY
Number of Elements	4

SUB-INDEX	**0**
NAME	Number of elements
Data Type	Integer16
Access	RO
PDO Mapping	No

SUB-INDEX	**1**
NAME	Analog Output 1
Data Type	Integer16
Access	RW
PDO Mapping	Yes

to

SUB-INDEX	**4**
NAME	Analog Output 4

Data Type	Integer16
Access	RW
PDO Mapping	Yes

10.6.19 – Object 6421h: Analog Input Interrupt Trigger Selection

Determines which events cause an interrupt for a specific analog channel.

INDEX	**6421h**
NAME	Analog Input Interrupt Trigger Selection
Object Code	ARRAY
Number of Elements	6

SUB-INDEX	**0**
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	**1**
NAME	Trigger Selection for Analog Input 1
Data Type	Unsigned8
Access	RW
PDO Mapping	No

to

SUB-INDEX	**6**
NAME	Trigger Selection for Analog Input 6
Data Type	Unsigned8
Access	RW
PDO Mapping	No

Bits set in the list below refer to ways in which interrupts may be triggered.

Bit Number	**Description**
0	upper limit exceeded
1	input below lower limit
2	input changed by more than delta
3*	input reduced by more than negative delta
4*	input increased by more than positive delta
5	Reserved
6	Reserved
7	Reserved

* not supported yet

10.6.20 – Object 6422h: Analog Interrupt Source

Determines which channel has produced an interrupt. Bits set relate to the number of any channels that have produced interrupts.

INDEX	**6422h**
NAME	Analog Interrupt Source
Object Code	ARRAY
Number of Elements	2

SUB-INDEX	**0**
NAME	Number of elements
Data Type	Unsigned32
Access	RO
PDO Mapping	No

SUB-INDEX	**1**
NAME	Analog Interrupt Source Channels 1-6
Data Type	Unsigned32

Access	RO
PDO Mapping	No

10.6.21 – Object 6423h: Global Analog Interrupt Enable

Globally enable/disable analogue input interrupts. By default, no analogue input activates an interrupt.

INDEX	**6423h**
NAME	Global Analog Interrupt Enable
Object Code	VAR
Data Type	Unsigned8
Access	RW
PDO Mapping	No
Default Value	0x00

10.6.22 – Object 6424h: Analog Input Interrupt Upper Limit

When enabled, interrupt triggered when analogue input rises above this value.

INDEX	**6424h**
NAME	Analog Input Interrupt Upper Limit
Object Code	ARRAY
Number of Elements	6

SUB-INDEX	**0**
NAME	Number of elements
Data Type	Integer32
Access	RO
PDO Mapping	No

SUB-INDEX	**1**
NAME	Upper Limit for Analog Input 1
Data Type	Integer32
Access	RW
PDO Mapping	No

to

SUB-INDEX	**6**
NAME	Upper Limit for Analog Input 6
Data Type	Integer32
Access	RW
PDO Mapping	No

– Object 6425h: Analog Input Interrupt Lower Limit

When enabled, interrupt triggered when analogue input falls below this value.

INDEX	**6425h**
NAME	Analog Input Interrupt Lower Limit
Object Code	ARRAY
Number of Elements	6

SUB-INDEX	**0**
NAME	Number of elements
Data Type	Integer32
Access	RO
PDO Mapping	No

SUB-INDEX	**1**
NAME	Lower Limit for Analog Input 1
Data Type	Integer32
Access	RW
PDO Mapping	No

to

SUB-INDEX	6
NAME	Lower Limit for Analog Input 6
Data Type	Integer32
Access	RW
PDO Mapping	No

10.6.23 – Object 6426h: Analog Input Interrupt Delta

When enabled, interrupt triggered when analogue input changes by more than this value from previous reading (rising or falling).

INDEX	6426h
NAME	Analog Input Interrupt Upper Delta
Object Code	ARRAY
Number of Elements	6

SUB-INDEX	0
NAME	Number of elements
Data Type	Integer32
Access	RO
PDO Mapping	No

SUB-INDEX	1
NAME	Delta Limit for Analog Input 1
Data Type	Integer32
Access	RW
PDO Mapping	No

to

SUB-INDEX	6
NAME	Delta Limit for Analog Input 6
Data Type	Integer32
Access	RW
PDO Mapping	No

10.6.24 – Object 6443h: Analog Output Fault Mode

Analog output fault mode. Defines whether an output reverts to a default output value on event of a fault.

INDEX	6443h
NAME	Analog Output Fault Mode
Object Code	ARRAY
Number of Elements	4

SUB-INDEX	0
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	1
NAME	Fault Mode Analog Output 1
Data Type	Unsigned8
Access	RW
PDO Mapping	No

to

SUB-INDEX	4
NAME	Fault Mode Analog Output 4
Data Type	Unsigned8
Access	RW
PDO Mapping	No

Value meaning:

Bit Number	Description
0	actual value rest
1	reverts to default value unconverted
2	reverts to default value converted

10.6.25 – Object 6444h: Default Analog Output Fault State Unconverted

Default output fault value (unconverted). If the fault mode flag is set, the output will revert to the value defined here on detection of a fault.

INDEX	6444h
NAME	Default Analog Output Fault State Unconverted
Object Code	ARRAY
Number of Elements	4

SUB-INDEX	0
NAME	Number of elements
Data Type	Integer32
Access	RO
PDO Mapping	No

SUB-INDEX	1
NAME	Default Analog Output 1
Data Type	Integer32
Access	RW
PDO Mapping	No

to

SUB-INDEX	4
NAME	Default Analog Output 4
Data Type	Integer32
Access	RW
PDO Mapping	No

10.6.26 – Object 67FEh: Error Behavior

This object determines the state changing in the case of a communication or IO error.

INDEX	67FEh
NAME	Error Behavior
Object Code	ARRAY
Number of Elements	3

SUB-INDEX	0
NAME	Number of elements
Data Type	Unsigned8
Access	RO
PDO Mapping	No

SUB-INDEX	1
NAME	Communication Error
Data Type	Unsigned8
Access	RW
PDO Mapping	No

SUB-INDEX	2
NAME	Output Error
Data Type	Unsigned8
Access	RW
PDO Mapping	No

SUB-INDEX	3
NAME	Input Error
Data Type	Unsigned8
Access	RW
PDO Mapping	No

Bit Number	Description
0	TO PRE-OPERATIONAL
1	NO STATE CHANGING
2	TO STOPPED

10.6.27 – Object 67FFh: Device Type for multi profile devices

Normally in DS401 this entry is reserved. If the profile is used in multi profile devices like defined in DS402, this entry contains the device type, defined as Index 0x1000 in DS301.

INDEX	67FFh
NAME	Device Type for multi profile devices
Object Code	VAR
Data Type	Unsigned32
Access	RO
PDO Mapping	No
Default Value	0x00040196

11 ACCESSORIES

11.1 OVERVIEW

Model number	Description	Comments
xxxxxxx	Power Supply Plug	
xxxxxxx	Digital Plug	
xxxxxxx	Analog Plug	
xxxxxxx	Encoder Input Plug	
xxxxxxx	RJ45 CAN Cable 0.3m S/STP Cat. 5	
xxxxxxx	RJ45 CAN Cable 0.6m S/STP Cat. 5	
xxxxxxx	RJ45 CAN Cable 1m S/STP Cat. 5	
xxxxxxx	RJ45 CAN Cable 2m S/STP Cat. 5	
xxxxxxx	RJ45 CAN Cable 5m S/STP Cat. 5	
xxxxxxx	RJ45 CAN Cable 10m S/STP Cat. 5	
xxxxxxx	RJ45 CAN Cable 20m S/STP Cat. 5	
xxxxxxx	RJ45 CAN Cable 50m S/STP Cat. 5	

Table: Model numbers for accessories

11.2 POWER SUPPLY PLUG

11.2.1 General Information

The single row 2 pins terminal is used to connect the supply voltage for Module-IO.

11.2.2 Order Data

Model number	Description	Image
xxxxxxx	Weidmüller BLZF 3.5/2 Réf.: 1690420000	

Table: Power Supply Plug

11.2.3 Technical Data

Description	xxxxxx
Number of pins	2
Type of terminal	Cage clamps
Distance between contacts	3.5mm
Resistance between contacts	<4.5mO
Nominal Voltage	300V
Current Load	Max. 10A / contact
Connection Cross Section	0.08mm² - 1.5mm²

Table: Technical Data for the Power Supply Plug

11.3 DIGITAL PLUG

11.3.1 General Information

The double row 20 pins terminal is used by digital inputs and outputs

11.3.2 Order Data

Model number	Description	Image
xxxxxxx	Weidmüller B2L 3.5/20 Réf.: 1727710000	

Table: Digital Plug

11.3.3 Technical Data

Description	xxxxxx
Number of pins	20
Type of terminal	Cage clamps
Distance between contacts	3.5/2.5mm
Resistance between contacts	<4.7mO
Nominal Voltage	300V
Current Load	Max. 5A / contact
Connection Cross Section	0.08mm² - 1mm²

Table: Technical Data for the Digital Plug

11.4 ANALOG PLUG

11.4.1 General Information

The double row 16 pins terminal is used by analogs inputs and outputs

11.4.2 Order Data

Model number	Description	Image
xxxxxxx	Weidmüller B2L 3.5/16 Réf.: 1727690000	

Table: Analog Plug

11.4.3 Technical Data

Description	xxxxxx
Number of pins	16
Type of terminal	Cage clamps
Distance between contacts	3.5/2.5mm
Resistance between contacts	<4.7mO
Nominal Voltage	300V
Current Load	Max. 5A / contact
Connection Cross Section	0.08mm² - 1mm²

Table: Technical Data for the Analog Plug

11.5 ENCODER INPUT PLUG

11.5.1 Order Data

Model number	Description	Image
xxxxxxx	DSUB9 Male	

Table: Encoder Input Plug

11.6 RJ45 CABLES

11.6.1 General Information

RJ45 Cables are used between ELITE device and alls CANOPEN-IO-MODULES

11.6.2 Order Data

Model number	Description	Image
xxxxxxx	RJ45 CAN Cable 0.3m S/STP Cat. 5	
xxxxxxx	RJ45 CAN Cable 0.6m S/STP Cat. 5	
xxxxxxx	RJ45 CAN Cable 1m S/STP Cat. 5	
xxxxxxx	RJ45 CAN Cable 2m S/STP Cat. 5	
xxxxxxx	RJ45 CAN Cable 5m S/STP Cat. 5	
xxxxxxx	RJ45 CAN Cable 10m S/STP Cat. 5	
xxxxxxx	RJ45 CAN Cable 20m S/STP Cat. 5	
xxxxxxx	RJ45 CAN Cable 50m S/STP Cat. 5	

Table: RJ45 Cables

11.6.3 Technical Data

Description	xxxxxx
Type	Uninet 5502 4P
Category	5e
Class	D
Conductors	4 x 2 x AWG24
Shield	S/STP
Cross Section	6.1mm

Table: Technical Data for RJ45 Cables

12 NOTES